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BOOK REVIEW

Proceedings : 1992 CERN School of Computing (CERN 93–03)
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This publication from CERN is a proceeding of the 15th CERN School of Computing which was organized in Italy in 1992 in collaboration with the "Istituto Nazionale di Fisica Nucleare" (INFN). The proceedings contain written accounts of a large number of lectures given by experts in respective fields of computing, covering a wide variety of topics which concern activities of CERN. In view of the importance of several topics, it is important, in the opinion of the reviewer, to reproduce below the contents of the proceedings :

1. Software design, the methods and tools, by S M Fisher (RAL, Chilton, UK) and P Palazzi (CERN, Geneva, CH).

In this lecture, OMT (Object Modelling Technique), a method for software design, was introduced and compared with similar approaches. The participants were asked to choose a project and applied OMT to produce a design document. The outlines are given in the lecture.

2. The status of parallel computing, by Paolo Zanella (CERN).

In this lecture, the status of parallel computing has been described with an analogy to the existing sequential computing based on Von Neumann Model. The importance of parallel computing has been realized today considering the fundamental limitations of computing power of sequential processors due to speed of light (30 cm/ns). The speed of electrical signals in a conducting wire is of the order of 20 cm/ns and on a silicon chip is about 1 cm/ns. Thus, it takes at least 1 ns for a signal to travel across a chip and during this time one can at best perform one floating point operation (1 Flop) if signals are treated sequentially. Hence, a processor whose actions cannot occur in parallel, is limited to a Giga Flops (1 Billion Floating Point Operations per second). Current Super-computers can now exceed this limit in practice just because they exploit parallelism wherever possible. Therefore, one has to design computers capable of having simultaneous activities in order to go beyond these limits.

Parallel computing is thus becoming a reality, although this change from a sequential to parallel computing model is far from trivial—as commented by the speaker.

3. An introduction to the APE 100 Computer, by N Cabibbo (INFN, Rome), F Rapuano (INFN, Rome) and R Tripiccione (INFN, Pisa).

This paper describes the physical background for the development of APE 100 parallel computer for theoretical physics. The architecture of APE 100 has been described followed by examples.

4. Introduction to distributed systems, by S J Mullender.

5. Interprocess communication, by S J Mullender.

6. SHIFT . Heterogeneous Work station Services at CERN, by Godon Lee, Les Robertson CERN, Geneva, Switzerland.

The CORE (Centrally operated RISC environment) services at CERN's Central Computing Centre group together a set of physics data processing facilities using this technology. The RISC-based work stations have supplemented CERN's scientific batch computing through large mainframes and supercomputers.

7. Off-line software in HEP : Experience and Trends, by N A McCubbin, Rutherford Appleton Lab., UK.

This is a written version of two lectures on the topic of experience and trends in software for large HEP experiments.

8. Is there a future for event display ? by H Drevermann, CERN, Geneva, D Kuhn, Innsbruck, B S Nilsson, CERN, Geneva and Niels Bohr Institute, Copenhagen.

9. Neural networks for trigger, by S R Amendolia, Italy.

The complexity of the triggering problem in High Energy Physics has been reviewed briefly. The use of artificial neural networks is introduced as a natural evolution of conventional techniques. Real time applications have been presented.

10. Computer-aided design for electronics, by S Centro, Italy.

A general presentation of the top-down method for digital design has been introduced through examples.

11. CADD, Computer aided detector design, by Patrick Michael Ferran, CERN, Geneva, Switzerland.

As mentioned in the introduction, building a modern particle physics detector is a complex project. Designing and manufacturing different sub-elements of a detector in different places in Europe or the World has to be co-ordinated to ensure that the elements

when assembled properly must also function properly. CADD aims to unite these ambitions in a design, engineering, simulation and manufacturing cycle for LHC detectors.

12. Second generation expert systems, by David A Bell, Northern Ireland.

In recent years, there has been tremendous interest in Expert Systems which attempt to capture the "expertise" of human specialists in important areas of application. The author finds that the level of success in applications has not matched that of research and development effort that has gone into them. As such, a new generation of Expert systems is required.

13. Benchmarking computers for HEP, by Eric McIntosh, CERN, Geneva, Switzerland.

In this report, the results of CERN benchmark tests carried out on a variety of Mainframes and Workstations during last 15 years have been summarized.

14. Multidatabases in health care systems, by David Bell, University of Ulster, UK.

The paper gives an overview of the features which characterise Distributed Database Systems. The author has outlined the importance of having DDBs rather than IDBs, specially in health care and other community programmes.

15. Multimedia networks; What's New ? by D R McAuley, University of Cambridge, UK.

"The performance of modern computing devices and networks allows the consideration of applications which integrate various real time media, such as video and audio, into a distributed computing system". The present note addresses some of the problems and some of their solutions.

16. Pandora : An experimental distributed multimedia system, by D R McAuley, University of Cambridge, UK.

The "Pandora" project investigates issues in support of audio and video in a distributed computing environment. The system was designed and is being used in Cambridge Computer Laboratory and Olivetti Research Laboratory. The notes outline the structure of Pandora's box, the networks, applications and future directions.

17. Experience with some early computers, by R F Churchhouse, University of Wales, UK.

This is a personal account of author's experience with some of the earliest computers from the Manchester Mark I (1951) to Univac 1103 (1957). Some of the special features have been mentioned.

18. Turing & ACE : Lessons from a 1946 Computer Design, by B E Carpenter, CERN, Geneva, Switzerland.

Alan Turing, a British mathematician, presented the World's first complete design for a stored-program electronic computer, ACE. The note presents an interesting account of Turing and his ACE.

The Proceedings, as a whole, is a good documentation and an useful publication from CERN.

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